ACCESSION #: 9609100207

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Susquehanna Steam Electric Station - Unit 1 PAGE: 1 OF 3

DOCKET NUMBER: 05000387

TITLE: Reactor Scram Following Turbine Trip on Indicated High

Vibration

EVENT DATE: 08/01/96 LER #: 96-006-00 REPORT DATE: 08/30/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 098

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Richard R. Wehry, Nuclear Licensing TELEPHONE: (717) 542-3664

Engineer

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0533 hours on August 1, 1996, with Unit 1 operating in Condition 1 (Power Operation) at 98% power, a reactor scram occurred, per design, when the Main Turbine tripped on indicated high vibration. Both Reactor Recirculation pumps also tripped, per design, and all control rods fully inserted. Reactor water level dropped to +6.6 inches and all reactor Level 3 (+13 inches) isolations occurred per design. Reactor pressure peaked at 1127 psig, momentarily cycling Safety Relief Valves G, K, L, M and N. All Primary Containment parameters remained normal throughout the event. The cause of the turbine

trip was attributed to a false, spurious signal from the turbine #1 bearing's vibration instrument loop. The investigation also concluded that the response to some precursor alarms, which may have precluded the turbine trip, was less than adequate. The plant was safely shut down and there were no safety consequences or compromises to public health or safety during this event, nor would there have been under different initial operating conditions. This transient is within the bounds of a turbine trip as analyzed in Chapter 15 of the Susquehanna FSAR. The components of the #1 bearing vibration monitoring loop which most likely could have caused the false, spurious signal were replaced. Training on expectations and sensitivity to alarms was completed. Actions to prevent recurrence include additional monitoring of vibration data, procedural enhancements, failure analysis of removed components, enhancing significance reviews of events to better identify precursors to more significant events and evaluation of design changes to eliminate unnecessary single failure design and obsolete equipment.

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DESCRIPTION OF EVENT

At 0533 hours on August 1, 1996, with Unit 1 operating in Condition 1 (Power Operation) at 98% power, a reactor scram occurred, per design, when the Main Turbine (EIIS Code: TA) tripped on indicated high vibration. Both Reactor Recirculation pumps (EIIS Code: AD) also tripped, per design, and all control rods (EIIS Code: AA) fully inserted. Reactor water level dropped to +6.6 inches and all reactor Level 3 isolations occurred per design. Reactor pressure peaked at 1127 psig, momentarily cycling Safety Relief Valves (EIIS Code: SB) G, K, L, M and N. All Primary Containment parameters remained normal throughout the event. There were no equipment malfunctions during the transient.

CAUSE OF EVENT

A root cause analysis of this event was performed by a multi-disciplined investigative team. The reactor scram was caused by a Main Turbine control valve fast closure as the result of an indicated high turbine

vibration signal. Subsequent investigations attributed the turbine trip to a false, spurious signal from the turbine #1 bearing's vibration instrument loop. This vibration trip instrument logic is of a single failure design.

The investigation also concluded that the response to some precursor alarms, which may have precluded the turbine trip, was less than adequate. This included a low sensitivity to risk significant instrumentation malfunction and an inadequate alarm response procedure for turbine high vibration.

REPORTABILITY / ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(iv), in that an unplanned Engineered Safety Feature (ESF) actuation occurred when the Reactor Protection System (RPS; EIIS Code: JC) initiated an automatic reactor scram following a turbine control valve fast closure. All major equipment operated per design during the transient, Emergency Core Cooling Systems (ECCS) were not challenged and no abnormal operator actions were required to place the unit in a stable condition. The plant was safely shut down and there were no safety consequences or compromises to public health or safety during this event, nor would there have been under different initial operating conditions. The transient was within the bounds of a turbine trip as analyzed in Chapter 15 of the Susquehanna FSAR.

In accordance with the guidance provided in NUREG 1022, Supplement 1,

Item 14.1 and 10CFR50.4(d), the required submission date for this report was determined to be September 3, 1996.

CORRECTIVE ACTIONS

The components of the #1 bearing vibration monitoring loop which most likely could have caused the false, spurious signal were replaced.

Training of station personnel concerning expectations and sensitivity to alarms was completed. The alarm response procedures for turbine high vibration were enhanced and the #1 turbine bearing vibration trip was temporarily bypassed. Increased monitoring of turbine vibration was performed during the subsequent startup and will continue until the next refueling outage, scheduled for September 1996.

Actions to prevent recurrence include:

o Additional monitoring of turbine vibration data;

o Evaluating the need to enhance procedures concerning documenting, communicating and ensuring that adequate actions are taken to investigate unexplained, important alarms;

o Performing lab failure analysis on the removed, suspect components;

o Enhancing significance reviews of events to better identify precursors, or potential precursors, to more significant events (including internal events, industry events, event prioritization and resource management);

o Evaluating possible design changes to eliminate unnecessary single

failure design and to upgrade obsolete equipment.

ADDITIONAL INFORMATION

Failed Component: None identified. Failure analysis of removed,

suspect components is being performed.

Previous Similar Reported Events: None.

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PP&L Pennsylvania Power & Light Company

Two North Ninth Street o Allentown, PA 18101-1179 o

610/774-5151

AUG 30 1996

U.S. Nuclear Regulatory Commission

Attn: Document Control Desk

Mail Station P1-137

Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION

LICENSEE EVENT REPORT 50-387/96-006-00

PLAS - 675 FILE R41-2

Docket No. 50-387

License No. NPF-14

Attached is Licensee Event Report 50-387/96-006-00. This report was

determined reportable per 10CFR50.73(a)(2)(iv), in that an unplanned

Engineered Safety Feature actuation occurred when the Reactor Protection

System initiated an automatic reactor scram following a main turbine trip

on indicated high vibration.

G. J. Kuczynski

Plant Manager - Susquehanna SES

Attachment

cc: Mr. H. J. Miller

Regional Administrator

U. S. Nuclear Regulatory Commission

475 Allendale Road

King of Prussia, PA 19406

Mr. Kenneth M. Jenison

Sr. Resident Inspector

U. S. Nuclear Regulatory Commission

P. O. Box 35

Berwick, PA 18603-0035

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